

PATENT

Attorney Docket No.: AMAT/8269/CMP/ECP/RKK

Express Mail No.: EV335470816US

Claims:

1. A substrate bevel cleaning chamber, comprising:
 - a chamber body defining a processing volume;
 - a rotatable substrate support member positioned in a lower portion of the processing volume;
 - at least three cooperatively rotatable substrate centering posts radially positioned around the rotatable substrate support member; and
 - a fluid dispensing nozzle movably positioned to dispense a cleaning fluid onto the top surface of a substrate positioned on the substrate support member.
2. The cleaning chamber of claim 1, wherein the at least three cooperatively rotatable centering posts comprise:
 - a vertically positioned shaft member;
 - a cap member positioned on a distal terminating end of the shaft member;
 - a raised central substrate support portion positioned at a rotational center of the cap member; and
 - a substrate centering member extending upward from the cap member and being positioned away from the rotational center of the cap member.
3. The cleaning chamber of claim 2, further comprising a substrate centering actuation mechanism, comprising:
 - at least three rotatable centering post receiving receptacles;
 - a linkage assembly connecting each of the at least three rotatable centering post receiving receptacles; and
 - a reduced friction actuator in communication with the linkage.
4. The cleaning chamber of claim 3, wherein the reduced friction actuator comprises an air actuated piston assembly positioned in a reduced friction cylinder.

PATENT

Attorney Docket No.: AMAT/8269/CMP/ECP/RKK

Express Mail No.: EV335470816US

5. The cleaning chamber of claim 3, wherein the linkage assembly is configured to cooperatively rotate the at least three centering post receiving receptacles.
6. The cleaning chamber of claim 1, wherein the fluid dispensing nozzle comprises a first pivotally mounted fluid dispensing nozzle in fluid communication with an etchant solution source and a second fluid dispensing nozzle in fluid communication with a rinsing solution source.
7. The cell of claim 1, comprising a backside fluid dispensing nozzle.
8. The cleaning chamber of claim 7, wherein the backside fluid dispensing nozzle comprises a cleaning solution dispensing nozzle and a rinsing solution dispensing nozzle.
9. The cleaning chamber of claim 2, wherein the substrate centering members are in communication with an actuator mechanism configured to simultaneously rotate each of the centering members.
10. The cleaning chamber of claim 3, wherein the reduced friction actuator and the linkage assembly are configured to rotate the substrate centering posts to engage a bevel of a substrate and center the substrate between the respective centering posts.
11. The cleaning chamber of claim 1, wherein the substrate centering posts are vertically movable between a loading position and a processing position.
12. A substrate cleaning cell, comprising:
 - a vacuum chuck positioned in a chamber body;
 - a plurality of rotatable substrate centering posts positioned radially around the vacuum chuck;

PATENT

Attorney Docket No.: AMAT/8269/CMP/ECP/RKK

Express Mail No.: EV335470816US

an actuator mechanism in communication with the substrate centering posts, the actuator mechanism being configured to simultaneously rotate the substrate centering posts and vertically actuate the centering posts;

a pivotally mounted fluid dispensing arm movably positioned to dispense a first processing fluid onto a first side of a substrate positioned on the vacuum chuck; and

a fluid dispensing nozzle positioned adjacent the vacuum chuck, the fluid dispensing nozzle being configured to dispense a second processing fluid onto a second side of the substrate, the second side being opposite of the first side.

13. The substrate cleaning cell of claim 12, wherein the plurality of substrate centering posts comprise:

an elongated core member having a longitudinal axis therethrough;

a cap positioned on a distal terminating end of the core member;

a raised substrate support area on the cap that is coaxially positioned with the longitudinal axis; and

a substrate centering post positioned on the cap at an off-axis position.

14. The substrate cleaning cell of claim 13, wherein the actuator mechanism is in communication with the centering posts via a linkage mechanism, the linkage mechanism being configured to simultaneously and equally rotate the centering posts when the actuator is activated.

15. The substrate cleaning cell of claim 14, wherein the linkage mechanism comprises a cam arm attached to a lower terminating end of each of the plurality of rotatable substrate centering posts and a linkage arm connecting the cam arms to each other.

16. The substrate cleaning cell of claim 15, wherein the actuator mechanism further comprises a reduced friction cylinder having an air actuated piston assembly slidably positioned therein.

17. The substrate cleaning cell of claim 12, wherein the plurality of rotatable substrate centering posts are vertically movable between a loading position and a processing position.

18. The substrate cleaning cell of claim 17, wherein the plurality of rotatable substrate centering posts are configured to center a substrate thereon while being moved between the loading position and the processing position.

19. A substrate cleaning cell, comprising:

- a cell body having upstanding walls and a fluid drain basin;

- a rotatable vacuum chuck positioned centrally positioned in the fluid drain basin;

- at least 3 substrate centering members positioned at equal radial increments around the rotatable vacuum chuck, the substrate centering members comprising:

- a vertically oriented shaft having a longitudinal axis extending therethrough;

- a cap member positioned over an upper terminating end of the shaft;

- a raised central portion formed onto the cap member, the raised central portion having a maximum thickness at a location the coincides with the longitudinal axis; and

- a substrate centering post positioned on the cap member radially outward of the raised central portion, an upper terminating end of the substrate centering post extending from the cap member to a distance that exceeds the maximum thickness;

- a centering actuation mechanism in communication with the substrate centering posts; and

- a fluid dispensing arm pivotally connected to the cell body, the fluid dispensing arm being configured to dispense a processing fluid onto a first side of the substrate.

PATENT

Attorney Docket No.: AMAT/8269/CMP/ECP/RKK

Express Mail No.: EV335470816US

20. The substrate cleaning cell of claim 19, wherein the centering actuation mechanism comprises:

an eccentric cam members attached to a lower terminating end of the shaft;

a linkage member connecting the eccentric cam members of the respective shafts; and

a reduced friction actuator in communication with the linkage member, the reduced friction actuator being configured to impart equal rotational movement to the respective shafts via the linkage member and cams.

21. The substrate cleaning cell of claim 19, wherein the at least 3 substrate centering members are vertically movable between a loading position and a processing position.

22. The substrate cleaning cell of claim 19, wherein the fluid dispensing arm comprises a base portion pivotally mounted to the cell body, the base portion having an arm extending therefrom and a fluid dispensing nozzle positioned on a terminating end of the arm.

23. The substrate cleaning cell of claim 19, further comprising backside fluid dispensing nozzle positioned adjacent the substrate support member, the backside fluid dispensing nozzle being configured to dispense a processing fluid onto a second side of the substrate, the second side being opposite the first side.

24. A method for cleaning a bevel of a substrate comprising:

positioning a substrate on a raised central portion of plurality of substrate support posts while the substrate support posts are a loading position;

cooperatively rotating the substrate support posts to engage the bevel of the substrate with a corresponding plurality of substrate centering posts, the substrate centering posts being positioned radially outward of the central portion;

lowering the substrate support posts to a processing position;

PATENT

Attorney Docket No.: AMAT/8269/CMP/ECP/RKK

Express Mail No.: EV335470816US

engaging a backside of the substrate with a vacuum chuck and lifting the substrate off of the substrate support posts; and

rotating the substrate on the vacuum chuck while dispensing a first processing fluid onto the bevel of the substrate.

25. The method of claim 24, comprising dispensing a second processing fluid onto a frontside of the substrate and dispensing a third processing fluid onto the backside of the substrate.

26. The method of claim 25, wherein the second processing fluid dispensed onto the frontside of the substrate is deionized water, the first processing fluid dispensed onto the bevel of the substrate is an etchant solution, and the third processing fluid dispensed onto the backside of the substrate is a cleaning solution.

27. The method of claim 24, wherein dispensing the third processing fluid comprises pivoting a fluid dispensing arm inward over the substrate to a position above the bevel and dispensing the first processing fluid onto the bevel of the substrate.

29. The method of claim 25, wherein dispensing the second processing fluid comprises pivoting a fluid dispensing arm inward over the substrate to a position proximate a center of the substrate and dispensing the second processing fluid onto the center of the substrate.

30. The method of claim 28, wherein the second processing fluid is dispensed and terminated prior to the first processing fluid being dispensed onto the bevel of the substrate.